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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/067,167	02/04/2002	Anthony D. Kurtz	Kulite-69	4919
28581	7590	12/15/2004	EXAMINER	
DUANE MORRIS LLP			DOROSHENK, ALEXA A	
PO BOX 5203			ART UNIT	
PRINCETON, NJ 08543-5203			PAPER NUMBER	
			1764	

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/067,167

Applicant(s)

KURTZ, ANTHONY D.

Examiner

Alexa A. Doroshenk

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/22/04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Objections*

1. Claim 13 is objected to because of the following informalities: the claim recites "according to claim I" (the letter i capitalized) instead of the number 1. Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

2. Claims 7, 18 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 recites the limitation "said second silicon wafer" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. Since only one wafer has positively been recited in the claims, they have been interpreted as such.

Claim 18 recites "predetermined localized reaction sites". This is unclear as to as to any particular location and what defines these locations. For examination purposes these bonds are interpreted to be anywhere on the physical apparatus.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 8 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Little (4,392,362).

With respect to claims 1, 8, 9, 18 and 19, Little discloses an apparatus comprising:

a wafer of silicon (90);

a layer of borosilicate glass (95) (col. 8, lines 4-6) deposited on the silicon wafer (90);

a plurality of channels (94) between the silicon (90) and glass (95) with inlet and an outlet (col. 8, lines 13-16); and

wherein the silicon (90) and glass (95) are bonded by a field assisted bond (col. 8, lines 6-8).

It is held that oxygen ions would inherently form in the glass when field assisted bonding is used.

With respect to claims 2 and 3, Little discloses wherein the channels run in both X and Y directions on the structure (see figures 1,2 and 4).

With respect to claims 4 and 7, Little discloses wherein there are additional wafers which are bonded to each other (col. 4, lines 25-26 and figures 5, 6, 10d and 11).

With respect to claim 6, Little discloses wherein the channels are rectangular in cross-section (see figures 5, 6, 8c, 8d, 9b, 9c, 10d and 11).

With respect to claim 10, Little discloses wherein there are vertical ports in the top layer in communication with the channels to enable fluid to be introduced to said channels (col. 4, lines 37-40).

With respect to claims 11 and 20, Little discloses all of the same structural elements made up of the same materials and therefor would inherently be capable of producing a high electric field when a voltage is applied to the structure.

5. Claims 1, 4, 11, 12 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Grantham et al. (4,467,394).

With respect to claims 1,8, 9, 18 and 19, Grantham et al. discloses an apparatus comprising:

a wafer of silicon (20);

a layer of borosilicate glass (Pyrex) (14-17) deposited on the silicon wafer (23);

a plurality of channels (22) between the silicon (20) and glass (14-17) which, though not shown, would inherently have an inlets and an outlet; and

wherein the silicon (20) and glass (14-17) are bonded by a field assisted bond (col. 4, lines 45-52).

It is held that oxygen ions would inherently form in the glass when field assisted bonding is used.

With respect to claims 4 and 7, Grantham et al. discloses a second wafer of silicon (12) bonded to the glass layer (14-17) to form a middle layer of glass between silicon layers (12 and 20).

With respect to claims 12 and 17, Grantham et al. discloses wherein the channels include a metallized area (18) of aluminum or gold (col. 4, line 62-col. 5, line 1).

With respect to claim 20, Grantham et al. discloses a localized area in the channels capable of producing an electric field (18/24).

***Claim Rejections - 35 USC § 103***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
8. Claims 5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Little (4,392,362) in view of Ashmead et al. (5,690,763).

With respect to claim 5, Little discloses wherein the channels are vee or rectangular shaped incross-section and formed by etching, but does not disclose wherein the are circular in cross section.

Ashmead et al. discloses wherein etching can also be used to form curved/circular cross-sectional shaped channels/pathways (col. 14, lines 38-42). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the channels of Little with circular cross-sectional shape as it is merely the selection of another shape of channel formed by etching known to be effective in micro-reactors.

With respect to claim 13, Little discloses wherein the channels are from 5-500 microns wide and thus fails to disclose wherein the channels have a diameter between 1 to 10 mils.

Ashmead et al. teaches wherein in micro-reactors (which can be made up of silicon and borosilicate glass wafers) can have channels from 10-5000 micrometers (.4-197 mils). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the size the channels of Little larger when increasing the overall size of the reactor and since those particular dimensions of channels are known to be effective in a micro-reactor.

With respect to claim 16, Little fails to disclose wherein the silicon wafer is coated with silicon dioxide.

Ashmead teaches wherein silicon wafers in a micro-reactor can be coated with silicon dioxide in order to increase resistance to corrosion and wear (col. 6, line 58- col.



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7, line 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a silicon dioxide coating to the wafer of Little in order to gain the advantage of increased resistance to corrosion and wear as taught by Ashmead.

9. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Little (4,392,362), as applied to claim 1, and further in view of Robillard et al. (3,984,620).

With respect to both claims, Little discloses wherein the silicon wafers can be of those used in semiconductor electronics (col. 1, lines 12-29).

Robillard et al. teaches wherein silicon wafers for use in semiconductor are preferably intrinsic or doped silicon (col. 5, lines 4-7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use intrinsic or doped silicon for the wafers of Little as it is merely the selection of semiconductor appropriate silicon wafers known to the art and as taught to be preferable by Robillard et al.

### ***Response to Arguments***

#### **Drawings**

The objections to the drawings are withdrawn due to applicant's amendments.

#### **Specification**

The objection to the specification is withdrawn due to applicant's amendments.

35 USC 112, Second Paragraph Rejections

The 35 USC 112, second paragraph rejection of claims 1-17 is withdrawn due to applicant's amendments to the claims.

35 USC 102 and 103 Rejections

Applicant argues that Claim 1 recites "a miniature reaction chamber template structure for fabrication..." and that the device of Little is not a miniature reaction chamber template structure, but rather a miniature cryogenic device.

The examiner does not find that the phrase "a miniature reaction chamber template structure for fabrication..." to impart any structural difference from the apparatus of Little. Little discloses all of the same structure recited after the pre-amble of the claim and applicant has not indicated what structural features differentiate Little from being a "a miniature reaction chamber template structure for fabrication...". It is also noted that the intended use of the device is not a patentable distinction if all of the elements of that device are known.

***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

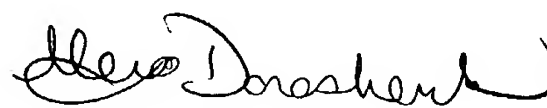
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexa A. Doroshenk whose telephone number is 571-272-1446. The examiner can normally be reached on Monday - Thursday from 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Alexa A. Doroshenk  
Examiner  
Art Unit 1764